

## Claims

1. A method of absorbing and/or storing gases, in which the gas to be stored is brought into contact with an electrochemically prepared metal-organic framework under conditions suitable for absorption of the gas, with absorption of the gas into the metal-organic framework occurring, and, if appropriate, the conditions are subsequently changed so that release of the stored gas occurs.
2. The method according to claim 1, wherein the gases which are stored or released are: saturated and unsaturated hydrocarbons, saturated and unsaturated alcohols, oxygen, nitrogen, noble gases, CO, CO<sub>2</sub>, synthesis gas, natural gases of all possible compositions or compounds which generate the gases which are subsequently released by the MOF.
3. The method according to claim 1 or 2, wherein the gas which is stored or released is selected from among H<sub>2</sub>; H<sub>2</sub>-comprising gas mixtures; H<sub>2</sub>-producing or -releasing compounds; methane, ethane, propane, butanes, ethylene, propylene, acetylene, Ne, Ar, Kr, Xe, CO<sub>2</sub> and CO<sub>2</sub>.
4. The method according to any of claims 1 to 3, wherein storage is carried out at a temperature of from 0 to 100°C.
5. The method according to any of claims 1 to 4, wherein storage is carried out at a pressure of from 1 to 300 bar (abs).
6. The method according to any of claims 1 to 5, wherein the stored gas is released again by reducing the pressure or increasing the temperature.
7. The method according to any of claims 1 to 6, wherein the MOF is present in a gastight container.
8. The method according to claim 7, wherein the container is connected to a fuel cell or is part of this.
9. The method according to claim 8, wherein the fuel cell is used in a power station, motor vehicle or cable-less application in electronics.
10. The method according to any of claims 1 to 9, wherein the electrochemically prepared metal-organic framework comprises a metal of groups Ia, IIa, IIIa, IVa to VIIIa and Ib and VIb of the Periodic Table of the Elements.

11. The method according to claim 10, wherein the metal is selected from the group consisting of Zn, Co, Ni, Pd, Pt, Ru, Rh, Fe, Mn, Ag and Co.
- 5 12. An MOF comprising a gas and obtainable by the method according to any of claims 1 to 11.
13. A container comprising an MOF according to claim 12.
- 10 14. A fuel cell comprising an MOF material according to claim 12 or a container according to claim 13.
- 15 15. A system or application comprising a material according to claim 12 or a fuel cell according to claim 14.
16. The system or application according to claim 15 selected from among power stations, motor vehicles, preferably passenger cars, goods vehicles and buses, cable-less applications in electronics, preferably mobile telephones and laptops.
- 20 17. The use of an electrochemically prepared metal-organic framework for storing or releasing gases.

**AS ENCLOSED TO IPRP**

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## Claims:

- 5 1. A method of absorbing and/or storing gases, in which the gas to be stored is brought into contact with an electrochemically prepared metal-organic framework under conditions suitable for absorption of the gas, with absorption of the gas into the metal-organic framework occurring, and, if appropriate, the conditions are subsequently changed so that release of the stored  
10 gas occurs.
2. The method according to claim 1, wherein the gases which are stored or released are: saturated and unsaturated hydrocarbons, saturated and unsaturated alcohols, oxygen, nitrogen, noble gases, CO, CO<sub>2</sub>, synthesis gas,  
15 natural gases of all possible compositions or compounds which generate the gases which are subsequently released by the MOF.
3. The method according to claim 1 or 2, wherein the gas which is stored or released is selected from among H<sub>2</sub>; H<sub>2</sub>-comprising gas mixtures; H<sub>2</sub>-producing or -releasing compounds; methane, ethane, propane, butanes, ethylene, propylene, acetylene, Ne, Ar, Kr, Xe, CO<sub>2</sub> and CO<sub>2</sub>.  
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4. The method according to any of claims 1 to 3, wherein storage is carried out at a temperature of from 0 to 100°C.  
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5. The method according to any of claims 1 to 4, wherein storage is carried out at a pressure of from 1 to 300 bar (abs).
6. The method according to any of claims 1 to 5, wherein the stored gas is released again by reducing the pressure or increasing the temperature.  
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7. The method according to any of claims 1 to 6, wherein the MOF is present in a gastight container.
8. The method according to claim 7, wherein the container is connected to a fuel cell or is part of this.  
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9. The method according to claim 8, wherein the fuel cell is used in a power station, motor vehicle or cable-less application in electronics.  
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10. The method according to any of claims 1 to 9, wherein the electrochemically prepared metal-organic framework comprises a metal of groups Ia, IIa, IIIa, IVa to VIIIa and Ib and VIb of the Periodic Table of the Elements.
- 5 11. The method according to claim 10, wherein the metal is selected from the group consisting of Zn, Co, Ni, Pd, Pt, Ru, Rh, Fe, Mn, Ag and Co.
12. A method of producing an electrochemically prepared metal-organic framework comprising a gas, wherein the gas is brought into contact with the framework  
10 and is absorbed in this.
13. A metal-organic framework obtainable by a method according to claim 12.
14. A container or fuel cell comprising an MOF material according to claim 13.  
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15. A system comprising a material according to claim 13 or a fuel cell according to claim 14, in particular for power stations, motor vehicles, preferably passenger cars, goods vehicles and buses.
- 20 16. An application of a material according to claim 13 or a fuel cell according to claim 14, in particular for cable-less applications in electronics, preferably for mobile telephones and laptops.
- 25 17. The use of an electrochemically prepared metal-organic framework for storing or releasing gases.